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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CARIASO, ALAN B

ART UNIT PAPER NUMBER

2875

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/342,210

Applicant(s)

KOHNO, MICHIO

Examiner

Alan Cariaso

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-7, 12-17, 19-24 and 29-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-7, 12-17, 19-24 and 29-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed March 21, 2003 has: cancelled claims 1, 8, 11, 18, 25 and 26; amended claims 2, 12, 22, 24 and 29; and added new claims 30-41. Currently, claims 2-7, 12-17, 19-24 and 29-41 are pending, and claims 8-11, 18 and 25-28 are cancelled.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
3. Claims 2-7, 12-17, 19-24 and 29-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 2, 12, 22, 29, 34, 36, 38 and 40 similarly recite "said converting optical system being arranged to place the predetermined plane and a light entrance surface of said light transmitting element / optical fiber in a Fourier transform relation". No such arrangement has been specified that would express any Fourier transform relation in the specification as originally filed. Such matter regarding the Fourier transform relation as now claimed is considered to be new matter.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 2-5, 12-15, 19-21, 30, 31 and 34-41 are rejected under 35 U.S.C. 102(b) as being anticipated by OMATA (US 5,218,660).

6. In regards to claims 2, 4, 5, 12, 14, 15 and 19-21, OMATA discloses an illumination optical system (figs. 2 & 10) comprising: an imaging optical system forming an image of light source ("1" being an Hg lamp with its center at the 1st focal point of elliptical mirror 2, col.4, lines 3-4) at a predetermined plane ("3a" disposed at the 2nd focal point of elliptical mirror 2, col.4, lines 6-8); a converting optical system (fly-eye lens "3" spaced from a collimator lens "4") directing light from the light source image to a total reflection type light transmitting element or optical fiber bundle (light pipe assembly 5); in regards to claims 19-21, the optical fiber bundle (5) of OMATA has a light entrance (5a) of a rectangular shape (col.4, lines 13-14) and light exit face of arcuate shape (col.4, lines 13-15 & 50-52); wherein the optical fiber bundle (5) comprises a total reflection type and distributed refractivity type optical fiber bundle (col.4, line 64 to col.5, line 33).

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7. In regards to claims 2, 3, 12 and 13, which recite the phrases " wherein said converting optical system is arranged to place the predetermined plane and a light entrance surface of said light transmitting element in a Fourier transform relation" (claims 2 and 12) and "wherein the light source image formed by said imaging optical system has an illuminance which is larger in a portion adjacent an optical axis of the light transmitting element than in a peripheral portion about the optical axis" (claims 3 and 13), any recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. Otherwise, these intended uses, conditions or functions are not given patentable weight, if no difference in structure from the prior art is claimed that results in these conditions. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).
8. In regards to claims 30 and 31, given the disclosed structure of at least a fly-eye lens and optical fiber bundle, it is inherent that the luminous intensity distribution ... has a shape without a central void. See below in response to arguments.
9. In regards to claims 34-41, OMATA comprises an exposure apparatus (col.3, lines 13-21) that includes the illumination optical system above (1-5, figs. 2 & 10) and further a projection optical system (80-fig.2) projecting a pattern of a mask (8) onto a wafer (W); a device manufacturing method of applying a resist (col.4, lines 31-33) to the wafer (W); transferring, by exposure, the pattern of the mask (8) onto the wafer (W) by use of the exposure apparatus (figs.2 & 10) and developing the wafer (W) having the

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pattern transferred thereto (col.1, lines 11-23). In regards to the converting optical system being arranged to place the predetermine plane and a light entrance surface of the particular light transmitting element in a Fourier transform relation, such a relation may be inherent given the structure claimed and considered to be an intended function or result that depends on the arrangement of the optical system as claimed. See further explanation in paragraph 7 above.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 22-24, 29, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over OMATA (US 5,218,660).

12. OMATA discloses applicant's claimed invention including the light transmitting element comprising an optical rod (col.4, line 64 to col.5, line 3; or light pipe "18"- figs.10-11) and at least the light source being a laser light source (col.2, lines 63-64). The optical rod or light pipe is considered to inherently produce the effect of a luminous distribution of a shape without a central void (see below in response to arguments) as claimed in claims 32 and 33. However, OMATA does not disclose a plurality of light sources or laser light sources.

13. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the illumination optical system of OMATA to include at least another or plural light sources in order to either form plural images of the light sources or increase the amount or intensity of light reaching the predetermined plane especially useful in increasing visibility of the object or light source(s) and in exposure of a wafer to effectively form a distinct pattern thereon from a mask.

Response to Arguments

14. Applicant's arguments filed March 21, 2003 have been fully considered but they are not persuasive.

15. In regards to amended or new claims 2, 12, 22, 29, 34, 36, 38 and 40, they commonly recite a similar phrase "said converting optical system being arranged to place the predetermined plane and a light entrance surface of said light transmitting element / optical fiber in a Fourier transform relation" which is considered to be new matter, rejecting all pending claims that directly recite it and depend from such claims under USC 112 1st paragraph. Such matter not originally disclosed has not been considered fully in the merits, but have been addressed in the rejection of claims. Some prior art are cited to show proper disclosure of optical systems having portions that express Fourier transform relation.

16. In regards to claims 30-33, applicant states that the claimed illuminance intensity distribution differs from the distribution "20" shown in figures 8 and 10 which represents an illuminance distribution and directs attention to page 12, line 15 to page 13, line 2

and page 14 line 13 to page 15 to line 6. Applicant intended to mean that the claimed luminous intensity distribution differs from the luminance distribution shown in figures 8 and 10. The difference is more clarified in fig. 14 and page 15 showing both illuminance distribution and light distribution characteristic (proposed to be changed to "luminous intensity distribution" in drawings filed March 13, 2001). Since the specification does disclose that the claimed effective function or condition to avoid this central void is done so at least by the structure "optical rod 22 or 42" in figures 12-13 or by the "fly-eye lens 31" within the converting optical system in figure 14 or by fibers bounded together at random (pg.13, lines 15-19), it is apparent that these structures are anticipated by at least the fly-eye lens 3, fiber bundle (5) and optical rod or light pipe (18) of OMATA. Therefore with the provided structure(s) of OMATA, the optical system is inherently made effective to make a luminous intensity distribution ... of a shape without a central void as claimed in claims 30-33.

17. However claims 30-33 commonly claim that the "said converting optical system is effective to make a luminous intensity distribution upon a light entrance surface of said light transmitting element into a distribution of a shape without a central void". Furthermore, since it is disclosed that

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. LEITH (US 3,754,814) shows a converting optics (53, 55,63,65,71-fig.4) that places an image of "51" into a Fourier transform upon reaching

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spatial filter 65. ICHIHARA (US 4,851,978) shows Fourier transform relations in figs. 3B-7B & 10 of the intensity distributions in figs. 3A-7A, 8 & 9 regarding the optical system in fig.1. SHIRAISHI et al (US 5,719,704) show Fourier transformed surfaces 40a & 40b (fig.2) upon light incident on fly-eye lenses 41a & 41b.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Cariaso whose telephone number is (703) 308-1952. The examiner can normally be reached on 9-5:30 M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703) 305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Alan Carias
Primary Examiner
Art Unit 2875

AC
June 15, 2003